

# The Builder.

NO. LIII.

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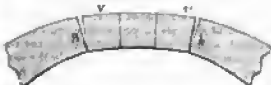
**PURSUING**  
the subject  
of Bridge-  
arches, and  
recurring to  
that which

terminated our last week's disquisition, it will be remembered we stated **Drift** to be the **ACTIVE FORCES IN ARCHES AND VAULTS**.—This drift, commencing at the crown of an arch, gradually reaches the base of the work supporting the superstructure.

But at first sight, a portion of this drift may seem to have an opposite course when an arch has been carried up so far as that its component voussoirs have a tendency to fall over from their beds.



But this is fallacious; for if a voussoir V have a tendency to leave its arch-bed B, and



have a drift away from its supporting pier equal to a ton weight, the voaseoir *c* on the opposite side of the vertex of the arch will have a counter-tendency to leave its bed *d*, and will exert an neutralise the contending forces, and in effect restore to the arch-bed *B* its ton of drift; and gravitation will go on (while the foundation of the work remains secure and unshifting, and while the crown of the arch is prevented from either rising or falling) precisely as though an counter-drift existed.

We now proceed in our deduction from these theorems.

1et. Drift is the active force in arches.

Indly. The action of the drift commences from the vertex of an arch, and continues from thence to the foundation of the work.

3rdly. Provision should be made for preventing fracture by reason of drift, through the increase of pressure as the work recedes from the vertex downwardly.

ethly. The provision for preventing fracture from the increase of drift must be made at the arch-joints of the voussoirs increasing in superficial extent as they recede from the vertex of the work; or if such an increase of the surfaces of their arch-joints be not adopted, the voussoir should be made of materials increasing in firmness and ability to resist compression continually more and more as they diverge from the vertex of the work.

34ly. If any circumstances prevent the pure adoption of one or the other of the above-mentioned provisions against false from dif-

cessity exist for restricting the bulk of any part of the work, harder materials may be used, or if it be necessary to amplify the bulk of the work, softer, and lighter material may be used.

6thly. The whole structure of a bridge should be catenarian.

7thly. The catenary must, at its crown or key, commence with strength sufficient to resist the pressure and concussion of the traffic, and of the roadway and parapets.

8thly. The depth of the key-stone must depend upon the nature of each traffic, &c.

Stily. A key-stone being the part of an arch most in jeopardy, requires on that account the greater care to prevent it from falling through; but pure natural catenarian construction requires that a key-stone should have less depth than any other part of the arch, and therefore each key-stone having little wedge-like upward increase, the two antagonistic principles clash with each other.

10thly. In order to obtain an upward increase, or enlarged estrados to the key-stone and neighbouring parts of an arch, without violating the natural graduated catenarian principle by unduly burdening the vousoirs in the neighbourhood of the key-stone, such key-stone and neighbouring vousoirs may be made of lighter materials, so as to present, by an extended surface, as much resistance against crushing, though of a softer nature.

lithly. Again, if the foundation of an arch be sacral, and therefore likely to settle from the weight of the work or any other cause, the keystone should commence at its crown or key with an increase of depth, in order that the upward or extrados *al* increase of the vousoirs may make up for the increase of jeopardy and liability to derangement on account of the uncertainty of the foundation: here again antagonistic principles exist, since the weakness of the foundation requires a diminution of weight, rather than an increase of weight; therefore, in such case, if a masonry bridge be adopted, the lightest kind of stone should be selected, so that provision against the derangement of the vousoirs may be made by increase of their depth, without increasing, but if possible rather diminishing, their weight.

12thly. The depth or strength of the key stone being settled, the strength of all the other parts of the catenary from thence taken in increasing sequence, as stated 4thly and 5thly.



(To be returned in our next.)

**The New Royal Exchange.**—Instructions have been given by the Committee for extending the site of the New Royal Exchange, to sell the triangular block of buildings between Cornhill and Threadneedle-street, facing the Bank-buildings, and which is to be taken down for the purpose of forming the western approach to the New Royal Exchange and the site for the Wellington Statue. The buildings to be sold comprise the premises occupied for many years by the San Fire Office the house where Messrs. Ladbroke & Co., the bankers, carried on the business of the establishment, and several residences adjoining. The sale is announced to take place by auction by Messrs. Pallen & Son, on the 19th instant, and appears to include a vast quantity of useful materials for building purposes. It is

## EMIGRATION

There can never be a happy industry at home, nor a just empire abroad, when, to relieve the country from its burdens or its troubles, expatriation is brought forward and supported as a forced necessity—it only leaves evils as they are; takes the sluggish ease of an assumption that they are incurable; and establishes thereupon that feeling of neglecting troubles which will assuredly cause them to grow to evils of greater magnitude.

The proprietor is led to this remark and the following observations, by a letter from Mr. Smith, of Greenwich, on the subject of Emigration.

When expatriatism is suggested and becomes almost universally adopted as the last hope of the country for relief from the distresses and troubles of its inhabitants, then is it indeed a sad state of things. It is a sad reflection upon a nation where the inhabitants of such nation are many, and a bodily-active and mind-energetic race, and where the chief features of the moving activity of its intellectual mind are prudence and wisdom to provide for the improvements of, the enjoyments of this life, and every contributive for the indulgence and information of the intellectual faculties; it is indeed a sad reflection that such prudence and wisdom should overlook the simple care and knowledge of providing all things, those which are most essential for the real comfort and happiness of the most needy, and for their means of existence in their own

But the prudence and wisdom of goodness of intention could never thus perplex the nation, could never thus invert the true welfare of the community,—it must have been produced by the unseen or unimpeded agency of cosmic prudence and wisdom of evil design. But the evil-designing serpent perplex affairs beyond the skill of infinite wisdom and goodness to unravel,—Almighty God rules, and will guide the simple-minded, acting in subordination to his will, to arrest the last effects of the malicious serpent in the midst of the career of its expected triumph, to all cases of evil, if evil is the design, or is the unseen tendency arising from thoughtless design, this will be accomplished. For the last pane is come—(to adopt the truthful perception of *The League* paper), "the last act of the drama" is truly arrived when, without providing honest remedial measures, we are leaving all confidence in the skill and ability of the many to incline to and to provide what is just and good as home-remedies and to become paid in the end, being forced to expatriate our fellow countrymen from their homes—in the, perhaps, greater miseries of distant shores.

Every one who is industrious may or might to gain subsistence in his own country—a better agriculture, the arts, manufactures, and commerce are encouraged. And what is to prevent their proper and fruitful encouragement in England, or in tirest Britain and Ireland? whereby the strength and prosperity of our nation would depend upon the number of its inhabitants, instead of depopulating and loosing the sinews of the glory of our country by forced expropriation.

Emigration is good when adopted as of free choice, and not as of forced necessity. When in such necessity our fellow-countrymen have to run from one distress to another, perhaps greater, as being in a distant land, not earned pay, and not able to have the same position established, the moment a separation in heart from us follows, we are sending them an embarrasment to other lands, to relieve our own; or we introduce into a colony the seed of dissatisfactions, dissensions, and dissensions—and thus generate, with the first establishment, as a colony, a British population, the great source of dissension, or separation to disgust from the parent nation whose population it comprises.

Emigration is good when we extend the influence of Britain's disposition of peace and good-will to all mankind by her well-affec-